UNIVERSITY OF ALBERTA

ISSUES IN VIDEO-CONFERENCING IN A NURSING EDUCATION PROGRAM

BY

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ABSTRACT

Video-conferencing was recently introduced in a large university Faculty of Nursing and collaborating nursing departments in three community colleges to facilitate teaching of baccalaureate nursing courses. A qualitative, descriptive design was used to identify issues that nursing faculty and students had regarding video-conferencing. Faculty familiarity with the technology and teaching methodology, course preparation, faculty team roles and relationships, and factors directly affecting engagement during classes such as quality of audio and video transmission, time use, access to resources, and teaching methodology employed were identified as major issues. The collaboration context was also identified as an issue affecting teaching and learning in video-conferencing courses. Thorough planning and preparation prior to initiating video-conferencing programs and courses, ongoing faculty development, and continuing development of teaching strategies and technology are suggested as ways to facilitate teaching and learning in video-conferencing. Further discussion on the fit of technology with desired learning outcomes is also recommended.

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Prelude

Distance education courses are increasingly available to students. The growing number of courses is in part due to advances in technology. Communication technologies are becoming relatively affordable and better able to respond to instructional requirements. In addition to traditional correspondence courses, there is now a choice among a variety of applications used in distance education such as audio, video, and computer conferencing. Cost, ease of use, access, and educational values and goals are common factors affecting institutional and individual choices.

The Faculty of Nursing at the University of Alberta has been using video-conferencing to enable its collaborative partners in different regions of the province to participate in nursing baccalaureate and masters courses. This provides students with the opportunity to complete a nursing degree without having to relocate to Edmonton. It also reduces the amount of faculty travel time between sites. Initial piloting of video-conferencing as a medium for teaching and learning over a distance occurred off campus during 1980-1983 and 1992-1993 using the equipment of a government department. Nursing courses have only been offered through university video-conferencing facilities since 1995. As a result, video-conferencing is a new experience for both faculty and students.

Identification of issues that faculty and students have about participating in video-conferencing is of growing relevance and importance as this medium becomes more widely available. The introduction of anything new, such as video-conferencing,

usually requires a period of time for adoption and adaptation before it can be assessed for effectiveness and appropriateness (Rogers, 1995). In the use of video-conferencing as an innovation in education, an essential part of the process of adoption of the innovation is an understanding of issues that those participating in teaching and learning through video-conferencing may have. Faculty and student perceptions of issues in the use of video-conferencing in education can greatly affect the approach they take to it and resultant outcomes - both in terms of performance and satisfaction.

The recent introduction of video-conferencing to nursing departments in Grande Prairie Regional College, Keyano College, Red Deer College, and the University of Alberta Faculty of Nursing, was precipitated by a newly developed collaborative baccalaureate nursing program. This situation, combined with the choice of video-conferencing equipment and technology employed, and the geographical distances among the collaborating partners has made the video-conferencing program between these institutions unique. As a result, some of the issues arising in this context may be as yet unknown. Demands on resources for operating costs (equipment purchased, equipment maintenance, and line rentals) and faculty development also warrant a careful examination of issues raised by faculty and students. Once issues have been identified, they can be addressed to decrease problems or concerns and to work towards developing excellence in nursing education through video-conferencing. It is therefore important that faculty and student issues are identified as early as possible to facilitate the addressing of those issues.

A descriptive study was undertaken at the University of Alberta Faculty of Nursing and nursing departments in Grande Prairie, Fort McMurray, and Red Deer colleges to identify and describe issues that faculty and students have regarding video-conferencing. A letter of introduction to this study was sent to each institution. Twenty-three faculty and student volunteers were interviewed. Content analysis techniques were employed to categorize the data. The three papers included in this thesis describe the issues identified by nursing faculty and students.

The first paper, entitled "Issues in facilitating teaching and learning: Faculty and student perspectives on video-conferencing" is an overview of issues identified during the study. A recurring theme by both faculty and students is the importance of interaction for teaching and learning. The second paper, "Context: The forgotten issue in video-conferencing", expands on one of the issues identified in the first paper. Although collaboration could be considered a separate issue, the context of collaboration into which this video-conferencing program was introduced affected how participants felt about the courses and how technology was perceived to have been used. The importance of understanding context is discussed as it relates to initiating video-conferencing courses, problem solving, and developing program and course evaluations.

"Competence in video-conferencing: The need for ongoing faculty development" is the third paper included in this thesis. As in the second paper, it is based on one of the issues identified in the first paper. However, in this paper I go

beyond naming the issue to identifying a pattern of faculty competence in teaching using video-conferencing. The implications of the progressive nature of faculty competence are discussed. The thesis concludes with a summary of themes from these three papers and their implications for practice and research.

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Issues in facilitating teaching and learning:

Faculty and student perspectives on video-conferencing

The University of Alberta's Faculty of Nursing has recently begun using video-conferencing in teaching core nursing undergraduate courses in the collaborative nursing program at three colleges, as well as graduate courses to students enrolled in the university's Master of Nursing program. This has allowed undergraduate students to complete a nursing degree without having to relocate to the main campus, and graduate students to take some of their course requirements off campus. An understanding of the teaching and learning that occurs in these video-conferencing classrooms has implications for developing meaningful course evaluations, and for planning technological and methodological changes that could improve future courses for both students and faculty.

University and college education has been primarily face to face interaction between faculty and students in a "traditional" classroom setting. More recently there has been an increase in the number of courses offered through distance education as sophisticated means of telecommunication become increasingly available and affordable for educational institutions. Video-conferencing is one of a number of different distance education technologies currently being used.

Increased use of technology to facilitate distance education has led to research on various aspects of teaching and learning in this new context. These include faculty training and development (Dillon, Hengst, & Zoller, 1991; LeBaron & Bragg, 1994),

attitudes of instructors toward distance education (Billings et al, 1994, Clark, 1993, Robinson, 1995), teaching styles (Gehlauf, Shatz, & Fryre, 1991, Shomaker, 1995b), and barriers affecting the adoption of new innovations (Koontz, 1989). A limitation of much of this research is the assumption that identified issues such as faculty workload, academic recognition, incentives, and institutional support (Clark, 1993; Johnston & Challis, 1994; Parkinson & Parkinson, 1989; Olcott & Wright, 1995; Willis, 1992) will be common regardless of the distance education technology used and the setting in which it takes place. Another assumption is that faculty from different disciplines (e.g. education and engineering) and institutions (e.g. university and community college) will have similar concerns about teaching and learning.

In contrast to the more general studies cited above, Jones (1992) and Aizley (1994) undertook evaluation research with students that specifically identified video-conferencing as the distance education technology and the settings in which classes occurred. Jones found that attitudes were generally positive while Aizley identified issues of concern to students. Some of these issues included: audio transmission, access to resources, access to instructors outside of class time, opportunity to speak during a conference, reluctance to be "on-camera", and sending and receiving assignments. Attention to describing unique contexts of these studies is important as physical arrangements for a video-conferencing class, such as screen sizes of viewing monitors (Ellis, 1992; Shomaker, 1995a), and professional and institutional cultures (Challis & Johnson, 1994; Clark, 1993; Donald, 1986) can also affect identified issues.

There is general agreement among most authors that the "distance education" experience is different from that of the traditional classroom. As the majority of literature is broadly defined as "distance education", however, it is difficult to discern which aspects are of concern to faculty and students in any one context. In addition, most research focuses on faculty *or* students rather than faculty *and* students. Consideration of both faculty and students within a clearly articulated context is needed to further understand issues related to teaching and learning in distance education.

The Study

The purpose of this descriptive study was to answer the question: "What are the issues faculty and students say they have about video-conferencing?" "Issues" is broadly defined in this study as categories of real or potential concerns or problems. A descriptive design was appropriate for this research as there is minimal literature specifically identifying issues about video-conferencing that students and faculty may have. In addition, there has not been research published in which the described context was similar to this study.

Data were collected by audio-taping semi-structured individual and group interviews. Each interview began with the open request: "Tell me about your experiences with video-conferencing." Probes were used to explore these experiences in greater depth and to clarify issues identified by the participants. Transcribed interviews were analyzed using content analysis techniques (Krippendorf, 1980; Miles & Huberman, 1994). Content analysis categorizes data into content categories through

the development of a coding scheme that is exhaustive and mutually exclusive. Content analysis techniques employed in this study included the coding of data reflecting the participants' ideas and experiences, continuous comparison and grouping of coded data, detection of recurring patterns and themes, identification of relationships between variables or concepts, and verification of groupings or relationships.

The rigour of this study was enhanced by interviewing both faculty and students from different contexts (i.e., previous experience with video-conferencing, location of experience, and class characteristics of size, subject of courses, and degree program enrolled in). Reliability of data analyzed was ensured through use of immediate reflection and rephrasing of comments by the researcher during interviews, double checking every transcribed interview for accuracy, having one committee member compare her coding of an interview with the researcher's coding, and by ongoing discussion with thesis committee members. Throughout data collection and analysis, memos were written by the researcher to record thoughts and insights about the emerging categories and the relationships between those categories. In addition, the findings of this study were presented and verified with a number of faculty and students who had taken part in video-conferencing courses.

Approval to conduct this study was obtained from the Ethical Review committee at the University of Alberta, Faculty of Nursing. Ten faculty and fifteen student volunteers participated in this study, for a total of twenty-three interviewees from four sites. Six of the ten faculty had taught between one and five courses using

video-conferencing. Of these six, three were considered to be the instructor with primary responsibility for an entire course, and three were responsible for instruction at their local sites. Two of the faculty had never taught a course through video-conferencing, two had experience of being students in a video-conferencing class, and two had been guest lecturers only. Students interviewed were studying for a four-year basic or two-year post-RN degree, or were taking graduate level courses. Thirteen of the students were taking a course at the time of the interviews. Four students were taking a course through video-conferencing for the first time, eight for the second time, and three for the third time.

The number of students per class at any one site ranged from 2 to 38. The smallest combined class size was 10 students and the largest was 62. The number of sites connected at any one time ranged from two to four. The average combined class size was approximately 30 students and most conferences connected three sites. Instructors or facilitators at the college sites always had students in their classrooms, whereas university faculty, who usually had primary responsibility for teaching a course, had enrolled students in their on-site classroom in about 50% of the course offerings.

Room arrangements for each site were different, as some were specifically designed for video-conferencing while others had been adapted to fit rooms currently available. Despite these differences, each site had two-way audio and video transmission, and received video images on a television monitor (approximately 35

inch screen). Six ISDN lines were used for transmission of audio and video signals. A voice activated mechanism controlled which site was transmitting at any one time.

Findings

Facilitation of teaching and learning was the central theme through which issues identified by students and faculty were experienced and interpreted. Within this theme there were four major factors which participants saw as affecting their video-conferencing experience: (1) familiarity - with video-conferencing, teaching methodology, and course content, (2) course organization, (3) engagement in the teaching and learning process, and (4) context. [Figure 1]. In this study, context was the collaborative environment into which video-conferencing was introduced. This paper focuses on the teaching learning process. Contextual issues of collaboration are discussed in a separate article.

Familiarity

Familiarity refers to the degree of knowledge and awareness in teaching through video-conferencing that has been integrated into: (1) the physical learning environment which includes classroom design, and in particular, video-conferencing technology, and (2) course content and teaching methodologies. The degree of familiarity with video-conferencing affects both the organization of courses by faculty and the ongoing experience of faculty and students during a course.

The importance of familiarity with video-conferencing equipment was expressed in a variety of ways. One faculty person reflected: "I think that there has to

be the orientation for the faculty in terms of... 'Which button do I push?'". This was echoed by the students who frequently expressed frustration that faculty who were controlling the video-conferencing equipment did not know how to operate it effectively: "You know, the first couple weeks, you think 'Well, everybody's got to learn!' But by the end of the class... you should be able to figure it out!" Familiarity with the technology also included an awareness of the quality of transmission being received at each of the sites. "Some of them [instructors] should watch themselves... to tape it at a distance and then sit down and watch, and try and think what it would be like to be just sitting and watching what's going on." This comment arose out of a belief that if instructors experienced the class presentation, and the quality of audio and video transmissions received at the distant sites, they would change the way they conducted the class.

The combination of distance and technology created a different teaching/learning environment which required adaptation of teaching strategies. Interactive methods used in traditional classes were not always suitable for video-conferencing. One student observed: "I think a lot of them just assume that you can sit there and kind of carry on as normal – and it doesn't work that way." Planning and evaluating changes required for teaching video-conferencing was a challenge for faculty. Faculty who had successful experience teaching the same course material in a traditional setting were more confident of the course content and thus were free to focus more on strategies. One faculty person reflected: "It's different. You might have

the content, but now you have to look at 'I delivered the content that way in the [traditional] classroom, but how does that fit with the technology?'"

Organization

Organization prior to a scheduled course was a major factor in the facilitation of teaching and learning in video-conferencing. There were two aspects of course organization that participants highlighted as important: (1) the details of course content preparation and (2) the communication and relationships among faculty who were teaching at the different nursing colleges and faculties.

Issues related to preparation of course content was a concern almost exclusively of faculty. One faculty member put it this way: "You have to be even ten times more organized I find with video-conferencing. If you're disorganized, you'll come across *very* disorganized in video-conferencing". Lack of advance preparation was keenly felt by the students. In response to a question of what would facilitate learning during a course, a student stated: "I don't know really what I'd recommend to someone taking it, but I know what to tell the teachers! Have everything to us before we actually start." Advance organization issues centred on two aspects of course preparation: (1) course outlines [including weekly handouts] and (2) the availability of resources necessary for completion of assignments. Having material to each site in advance also provided a print-base back-up in the event of a conference being canceled (e.g. due to technological problems).

The advance and ongoing preparations for classes resulted in some faculty feeling that their workload had been increased. This was particularly true for faculty with major responsibility for a course:

> "For any other course that I've ever taught I've spent more time on this course. And not in the reading - because I was familiar with a lot of the reading. So it wasn't my preparation for class. It was probably three days a week I would spend on teaching the class, getting the resources, getting them faxed up to the sites, making sure that everybody had the same information, collaborating [with the other instructors] so that we had a teleconference [to discuss] what we were going to do... and all that. A lot more time."

This contrasted with the experience of a faculty member who functioned more as an on-site instructor without primary responsibility for the course: "I don't think it [was] more time, it's just time spent differently. Instead of maybe preparing a lecture note, or class activities, or whatever that would have to be done, the time was spent collaborating with the other [instructors] or faxing."

The second major category of issues within "organization" relates to aspects of team teaching. The roles and responsibilities assumed by individual faculty within the team often resulted in conflict and confusion if not clearly defined and agreed upon in advance of the class. While this 'team-teaching' situation is not unique to video-conferencing, there was greater potential for conflict to occur as instructors rarely met

together in person because of the distances between campuses which ranged from 150-600km.

Consistency of the team-teachers in course directions and expectations was also an issue for a number of students. One student described the pattern of instructor responses to some questions: "The person in [site 1] says one thing, the person in [site 2] says one thing, the person in [site 3] says one thing…" Because of this real or perceived lack of consistency between instructors, many of the students did not feel they could receive the information needed or be able to negotiate an understanding of their assignments from their local instructors: "I don't think [the instructors] realize [the difficulty we have in getting clarification]… Now the instructor that is on site here isn't marking the assignments, and isn't presenting that course material, but I think a lot of them look at it and think 'You have a perfectly good instructor there'"

Engagement of Faculty and Students

The ability to engage students and faculty in teaching and learning during a course was dependent, in part, upon five essential components: (1) instructional methodology, (2) feedback, (3) time, (4) access, and (5) transmission quality. Like segments of a circle, when all these components are engaged, teaching and learning is facilitated.

Methodology includes the strategies and methods used in teaching as well as their theoretic and philosophic underpinnings. The majority of instructors tended to value highly relational, interactive learning, as stated by one of the interviewees:

> "...we have a very strong philosophy about one-on-one or person-to-person interaction. That's very integral to learning.... It is the human contact that's critical to everything we do... most of nursing really is the interaction with people; communication. How do you learn that by yourself? I don't think you do."

Facilitating this interaction was considered to be a greater issue in video-conferencing than in the traditional classroom. Although video-conferencing is a medium that allows for interaction to occur, the class environment is quite different from a traditional classroom, and faculty and students spoke of difficulties achieving meaningful interaction. Various strategies were employed to try and decrease the sense of distance and to engage the students in learning; most however, did not achieve a satisfactory result for students or faculty. Thus the development of appropriate teaching strategies was seen to be of prime importance: "I think [video-conferencing] has great potential - but we have to work at the strategies. The method of delivering [to] and entertaining... the students."

Feedback includes the verbal and non-verbal communication that occurs during a course offering. When there was ongoing, meaningful feedback or interchange between students and faculty at all sites there was engagement. Unfortunately, frustration occurred more often than engagement.

The biggest issue which interfered with interchange was the non-instantaneous transmission of video and audio, also referred to as time delay. The feedback that did

occur had to be planned. As a result, the communication that students and faculty value did not happen. One student compared the ideal versus what interaction occurred in the video-conferencing class: "...interaction is when you verbally give and take, and give ideas, and go back and forth... what interaction we did have was simply a verbal spitting out of information". Students considered this kind of interaction useless for them, although several felt it may have met the instructors' need to have feedback from students. Non-verbal feedback was also difficult to ascertain during video-conferencing due to time delays and unclear images on the television monitors.

A further area discussed in regard to non-verbal feedback was the use of alternate, asynchronous modes of communication (e.g. e-mail). Although e-mail contact addresses of the instructors were given out, the students interviewed did not use them. The reasons given were (1) e-mail was not accessible to them, and (2) most students did not like e-mail or they didn't know how to use it. Some instructors felt that it would be important in future courses to make better use of these mediums to enhance inter-site communication, but a concern was the time-consuming nature of this forum for instructors.

Access, that is the ability to make contact with an instructor, was an issue primarily for students. The physical presence of an instructor was seen by at least half of the students interviewed to have an impact on either their learning or their satisfaction with a course. "It is easier for me to sit down with somebody, and sit with them and say: 'These are my problems. What can we do about it?' I work better that

way... that immediate, close access to the professors." Some students at sites distant from the primary instructor felt they were at a disadvantage by not having that access: "It seems with the nursing classes, you end up with the sense that the people who are at the site where the instructor is have benefits of knowledge that you don't."

The process of contacting the instructor outside class time was also an issue for students. Although students were given phone numbers of the instructors, instructors were often not in their offices when students called. In addition, long distance phone costs were an issue. As no protocol was in place, faculty were unprepared for the possibility of students phoning collect.

Access to resources at each of the sites also became an issue for students who either had limited copies of class readings or smaller library collections. Inter-library loans were an option, but students who put in such requests found it took at least two weeks for the materials to arrive, which made it difficult or impossible to complete assignments on time. This contributed to feelings of disadvantage among students at distant sites.

The time available in a video-conferencing class is an issue that affects the strategies chosen for instruction, and is affected by the quality of transmission. It was of particular concern to students who felt that any time spent "waiting" was a waste of their valuable personal time. It was also of concern to faculty who felt pressured to deliver a course within a shorter time frame than for traditional classes. The shorter

time available was a result of time lost through technical difficulties and occasional conflicts in schedules between each of the participating sites.

Transmission quality refers to the abilities of the system to transmit audio and video signals. Identified issues included the ability to hook-up and maintain contact with all of the sites, as well as the need for each site to have clear audio and visual reception. Poor audio reception was a major issue for many students who felt they were losing out on material through no fault of their own. It required students to increase their listening efforts which in turn adversely affected their ability to interact spontaneously. Small images of people produced on the 35 inch monitor also contributed to the difficulty in seeing clearly, and jerky movements and frozen video frames were considered annoying and distracting. Issues related to transmission time delays (e.g., from the time a person spoke to the time other sites received the transmission) tend to be more directly related to interaction issues. Other factors influencing transmission quality were related to the physical set-up of the rooms (e.g. fans, echoes, lighting, location of microphones) and familiarity of the person operating the equipment with use of the mute function and volume control.

Discussion

The content analytic approach used in this study identifies issues described by the interviewees but does not quantify or rank them according to importance or impact on teaching and learning. While relationships between different issues are indicated, content analysis does not test the strength of these relationships or develop a theory

based on the research results. The issues identified in this study however, provide a base from which further exploration and consideration of concerns or problems in teaching and learning in a video-conferencing context should be based.

A comparison of the findings in this study with research conducted in other contexts, provides insight into common issues surrounding video-conferencing. Consistent with other research is the identification of transmission quality as a major problem (Aizley, 1994). The audio quality received and the time delays in audio and visual transmission between sites were of greatest concern. The relatively small screen size may have added to difficulties in engaging people visually. Therefore establishing reliable, high quality transmission in a video-conferencing program is important for maintaining satisfaction and promoting interaction among faculty and students.

Issues common to students include access to resources, access to instructors outside of class time, and reluctance to be "on camera" (Aizley, 1994). This highlights the importance of (1) thorough advance preparation by faculty in order to ensure that each site has all the resources required for a course, and (2) a clearly established process for communication between instructors and students that meets their needs and situation. Problems found relating to mailing and receiving assignments (Aizley) were not identified as issues by the interviewees in this study.

Some of the issues identified by faculty in this study differed from those in other studies. Participants in this research did not identify academic recognition, incentives, and institutional support as important. Rather, they were concerned

primarily with how to facilitate effective learning among all students. Methodology, verbal and non-verbal feedback, time use, quality of transmission, and access to resources are the key components which engaged faculty and students in teaching and learning through video-conferencing. These are areas in which strategies must be adapted and further developed.

Expertise in personal interaction in nursing is valued both in practice and in education. Many faculty believe that a highly interactive teaching and learning environment is not only an appropriate adult teaching methodology, but that it will translate into the development of effective communication skills in the students. In a video-conferencing classroom however, some students felt that interactive strategies were ineffective learning tools and instead were designed to provide feedback which benefited the instructors more than the students. This challenges commonly held assumptions about the value of this type of interaction for student learning in video-conferencing. It also suggests that a reliance by faculty on interaction strategies for guiding the direction of their teaching during a class may be inappropriate in this context. As both faculty and students found the desired spontaneous interaction almost impossible, it will be important to discern the type of feedback which is essential for effective and satisfying teaching and learning in the video-conferencing classroom.

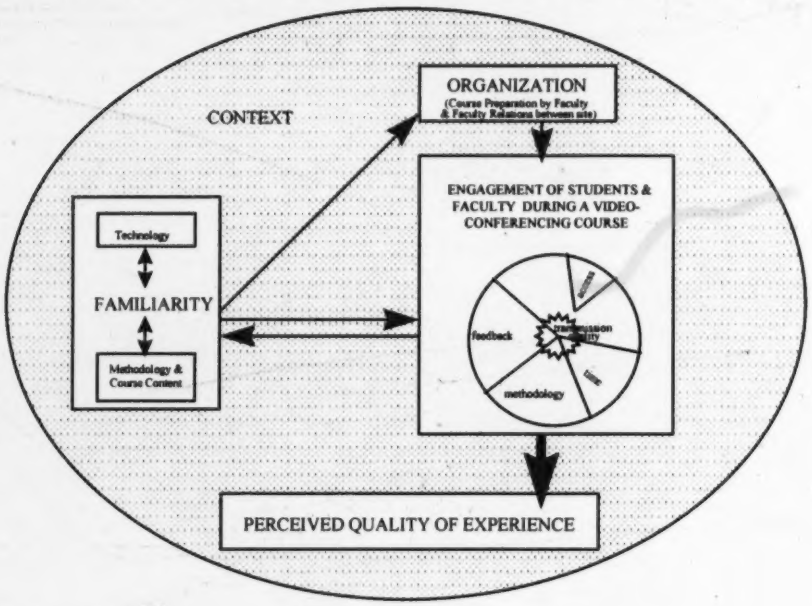
Difficulties in interaction raise questions about the fit of educational technology with desired learning outcomes. Nursing was described as "relational" and video-conferencing was perceived by many faculty and students as the antithesis of this. Is

there a way that "relational" values and skills such as empathy and active listening can be taught and evaluated over a medium that is non-instantaneous and which has frequent audio and visual distortion? Is it necessary to have the desired "relational" learning outcomes taught and evaluated in all nursing courses? In addition, will technology that is more affordable be able to facilitate these desired learning outcomes, or will factors related to "distance" or "technology" always impede this process? The answers to these questions are critical to the future of distance nursing education. In addition, these questions have implications for the nursing profession as they question commonly held values and assumptions about the process of educating nurses.

The video-conferencing classroom is indeed different from the traditional classroom. While personal satisfaction with video-conferencing may not be directly related to academic performance by students, it does appear to influence attitudes toward courses, and this in turn may have implications for institutions offering distance education. Video-conferencing is currently an attractive option for students who do not wish to relocate to the university campus, but to remain a desired choice for students in a technologically advancing society, the perceived quality of that experience will need to improve. To do this, teaching and learning strategies used in video-conferencing must be further developed and refined. In addition, educational methods traditionally advocated for developing the "relational" aspect of nursing should be re-examined for their fit with technology and their importance in nursing education.

Figure 1-1.

TEACHING AND LEARNING ISSUES IN VIDEO-CONFERENCING



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Context: The forgotten issue in video-conferencing

In recent years, a variety of factors have contributed to a growing number of collaborative agreements between universities and community colleges. Funding issues, attempts to increase enrollment, efforts to increase recognition and credibility, and educational and employment needs of rural communities are all cited as factors influencing the development of collaborative agreements among post-secondary educational institutions (Burton et al, 1990; Doucette & Teeter, 1985; Goodlad, 1987; McLachlan & Wood, 1994). In addition, the goal to have baccalaureate entry to practice in nursing by the year 2000 in Canada has resulted in a number of nursing programs at community colleges, schools of nursing, and universities developing collaborative relationships to link diploma and degree granting institutions (Dewis & Grenier, 1993).

A collaborative relationship can take a variety of forms. Transfer of course credits between institutions is one of the simplest arrangements. "Ladder" or transfer agreements, which allow students to take the initial part of a program at one institution and the final years at another, require a greater degree of collaboration. One of the most complex forms is the integration of each collaborating partners programs' into one new program to be offered in its entirety at each institution.

Shared philosophy, planning, and preparations lay the groundwork for establishing collaborative relationships. Characteristics of successful relationships include thorough preparation and planning prior to the commencement of a

collaborative program (Dodge, 1993), positive relationships of mutual trust and respect between individual faculty from each institution (Easterbrooks & Laughton, 1997; Micou, 1995; Stoloff, 1989), establishment of equal partnership between institutions (Ignash, 1992), commitment of individual faculty members to the collaborative process (Denton, 1993), and clearly defined and mutually agreed upon values and goals (Corrigan & Mobley, 1990; Dodge, 1993; Stoloff, 1989).

Successful collaborative relationships have resulted in increased opportunity for students to access education (Arblaster, 1988; Red Deer College, 1997), increased credibility of collaborating institutions (Red Deer College, 1997), decreased isolation of the participating colleges (Arblaster, 1988), and increased interaction and exchanging of ideas between faculty from the different institutions (Red Deer College, 1997). Aspects of a collaborative relationship viewed negatively include increased workload among faculty members, a perceived lack of control over courses taught by faculty from other collaborating institutions, reliance on a positive relationship between faculty, conflicts between collaboration and autonomy, and imbalance of power among collaborating partners (Easterbrook & Laughton, 1997; Ignash, 1992; Million & Vare, 1994; Moran & Mugridge, 1993; Red Deer College, 1997).

Consistent, continuous, and clear communication and mutual trust and respect are central to a successful collaborative relationship. In places which are considerably geographically distant, such communication between institutions can be challenging without increased opportunities for personal contact. Video-conferencing is a

communication technology that is currently being used for distant education among collaborating partner sites. In addition to creating an opportunity for colleges to offer baccalaureate courses taught by collaborating partners at the university, video-conferencing has the potential to increase communication opportunities among participating institutions by providing an audio and visual forum for discussion.

It is evident from the literature that the factors influencing collaborative relationships are numerous. The uniqueness of each institution's history, philosophy, faculty characteristics, values, local affiliations, and funding and enrollment realities, as well as the collaborative relationship agreed upon, and the forum for communication and teaching of courses between geographically separated partners all contribute to the collaboration experience. While there is some research on positive and negative characteristics of collaborative relationships, the impact of video-conferencing on and by collaboration is poorly understood. In addition, there little research addressing the teaching and learning that takes place in a collaborative, video-conferencing classroom.

The Study

Video-conferencing was recently introduced in Alberta nursing education to facilitate course offerings among three collaborating colleges and the university. The commencement of the collaborative agreements varied among institutions, with students from one community college beginning the new program in 1990, to the recent addition of two more institutions in 1995. The collaborative philosophy adopted by the

four institutions in this study was similar even though individual arrangements and processes within each agreement varied.

The philosophy of "working together to achieve common goals" was the framework for this collaborative nursing baccalaureate program. Each of the collaborating institutions participate as equals in identification of mutually acceptable goals and tasks which contribute to achievement of those goals. The agreement recognizes each partners' unique identity and history, including relationships with local institutions. In addition, there is a directive to avoid attempts to dictate policy from one institution to another. An administrative council composed of senior nursing administrators from each of the collaborative partners work together to develop new strategies and long range plans for the delivery and development of the collaborative baccalaureate nursing program, a part of which has included video-conferencing.

The purpose of this descriptive study was to identify faculty and student issues concerning video-conferencing. Twenty-three faculty and student volunteers from four of the collaborating nursing educational institutions took part in this study. These participants were asked to describe their experiences with video-conferencing during audio-taped, semi-structured interviews. Content analysis techniques (Krippendorf, 1980; Miles & Huberman, 1994) were used to categorize issues derived from participants' experience into content areas that were exhaustive and mutually exclusive. This paper focuses on collaboration which was one of the key issues identified in this analysis.

Reliability of data was ensured during the interview through frequent clarification of the interviewees' comments. In addition, all transcripts were double checked for accuracy with the original tapes. Recoding of one of the interviews by both the researcher and a member of her thesis committee and monitoring of ongoing analysis added to the reliability of the research. The inclusion of both faculty and students from four collaborating nursing education institutions using video-conferencing enhanced the rigour of this study, as did the variety of experiences of faculty and students. Approval for the study was received from the Ethical Review Committee at the University of Alberta.

Findings

Collaboration gradually emerged as an issue in video-conferencing for both faculty and students during the interviews and data analysis. The slow emergence of this issue occurred in part from hesitation by participants to discuss collaboration as they were unsure if it was related to video-conferencing. In addition, there was some reluctance to discuss issues related to collaboration because of their potentially sensitive and political nature.

Collaboration was viewed by some faculty and students as an issue on its own which had only a spurious relationship to video-conferencing. However, others were unsure of where the line between collaboration and video-conferencing was drawn: "…it could be a collaboration issue or it could be something else. I don't know! Or it could be one led to the other. Like the video-conferencing is an issue, therefore

collaboration is an issue". This was confirmed by another participant: "It is sometimes hard to separate what the issues are. Is it a technology issue? Or is it the collaboration thing? Sometimes [it is] really hard to know that."

The simultaneous introduction into the collaborative structure of a number of new situations contributed to the confusion as to what was a video-conferencing issue versus what was a separate issue. One faculty person described it as follows: "…it was a brand-new course, brand-new technology/video-conference, plus I was trying to teach the course in collaboration with two other people at distant sites. So… I'm not sure what is the collaboration and what is the technology part."

Collaboration and video-conferencing issues were further blurred through the use of video-conferencing technology. The mute function on the voice-activated video-conferencing system provides one example of how some people felt there was a blurring of issues. Keeping one's own site muted prevented other sites from listening to class discussions. Although the use of the mute button could be considered a technology issue, it could also be a way of maintaining a degree of control over others. One person who commented on how technology, and in particular the mute button was used, stated: "…a lot of this doesn't have anything whatsoever to do with video-conferencing. It's to do with collaboration and the principles of collaboration."

Collaboration issues may also have been difficult to discern because they were not discussed among faculty from the different institutions: "it [collaboration] is not something we talk about openly around here." Even some of the students felt that they

were affected by politically sensitive collaborative issues: "...And marking or grading papers or anything else, I think it's very hard to be consistent because of the fact that there are a lot of politics involved." Although participants in this study had raised these issues during the interview, none of them wanted to discuss it publicly for fear of negative repercussions to themselves or their institutions. Yet, for many of them, issues surrounding collaboration affected their experience of video-conferencing.

The video-conferencing program was established when collaborative agreements were made between the university and colleges. In addition to lessening travel time of teaching faculty between sites, it was felt that "video-conferencing was one way by which [the university] could establish certain types of standards that [they] wanted achieved in the early years of the program." As a result, video-conferencing was linked with collaboration. Students' feelings about video-conferencing reflected not only their experience of the technology but also their perceptions about the collaborative agreement. One student's comments echoed that of many others interviewed:

> "Basically I hate video-conferencing. I view it as a necessary evil. It is one of the few ways we're going to get an outreach program...since you don't go [to] the [university] to get your degree, they're being good enough to let you have a degree in your little hick college. And so you have to put up with these things."

The frustration, resignation, and hostility evident in this comment was felt by others. One faculty described an incidence as follows:

> "And the very first class the students said to me … 'We don't want to do this course by video-conference. Period. Is there something else that can be done? Because we don't want it.' And I had to tell them 'No. This is your contract with the university and I've been given this task and that's all we can do.' So that hostility and that tension I think was there through the whole course."

Tensions which arose during the courses were frequently a result of different understandings of what the collaborative agreement meant, and of how it would be worked out. Some faculty felt there were philosophical differences between college and university nursing education which complicated working together collaboratively:

> "…I think it's a college/university difference. I think there is a difference in terms of what the end goals have been for the nursing program… the types of things that you test, and the types of things you think are most important, [and the] types of skills that get valued may be somewhat different."

These differences can lead to: "problems of trying to maintain the standards of one institution over other institutions when all of the other institutions have their own use of styles, their own way of dealing with things. It's a very difficult area to deal with and it's one of the major, major problem areas of the collaborative program". This difficulty was reinforced by one of the participants: "…there is a lot of talk about being

equal partners - and [it's] not equal!... there are different standards for each partner in terms of how much involvement [i.e. required video-conferencing courses] there is from the university".

The degree of involvement from the university was often interpreted by people at each site as reflective of the degree of autonomy each institution had. Teaching of video-conferencing courses was done by a team of teachers from each of the participating institutions. This meant that there were qualified instructors at every site. However, one instructor was given primary responsibility for the course - which included course design and grading of students' work. As the primary instructor was usually based at the university, instructors at the other sites often felt that their qualifications were undervalued, and many college students resented having their primary instructor at a distance when they believed their own instructors were equally qualified. This led to a perception among students and faculty that there were "...control issues - in terms of the exam questions and who has to mark them, and ... common professionalism issues".

The team-teaching structure of these video-conferencing courses did not always lead to collaboration issues, however it did provide a forum for them to emerge. In discussing the roles of instructors, one faculty person reflected on her experience "collaborating" with others: "...there is not a common understanding about that kind of [collaborative] relationship...In my mind we collaborate and we all have input and there is no one person as the primary instructor, or in charge... but I think [others have]

a very different understanding about that". This was confirmed by another instructor who felt that they had collaborated, "but we did go into this experience with different ideas of what our roles were… We probably should have checked out those perceptions right at the very beginning…I would do that at the very beginning from now on".

The collaboration context out of which the video-conferencing program was developed affected the experience of faculty and students participating in video-conferencing. Some college students interpreted the video-conferencing classes as a way for one institution to control another without valuing their knowledge and experience. This perception, plus the physical distance they were separated from the university, made them feel that: "we're the fringe and it just carries over". A faculty person, reflecting on the impact of collaboration on video-conferencing and vice-versa said: "it's been frustrating, and [collaboration is] probably exacerbated because we are doing the [video-conferencing] courses". Video-conferencing did, however, increase the contact time among the institutions for working out the collaborative agreement. As one person stated: "We wouldn't be doing the collaboration in the same way if we weren't video-conferencing. At the same time we wouldn't be doing the video-conferencing if we weren't collaborating. So they are tied together".

Discussion

The unique context(s) into which a program is introduced can lead to a merging of what may initially seem to be distinctive issues of context and program. In this study, collaboration emerged as a video-conferencing issue because it was the context

into which the video-conferencing program was introduced. As there has been little video-conferencing research in which the external environment of context was considered, there was no anticipation of collaboration as an issue.

This has important implications for programs using telecommunication technologies such as video-conferencing for distant education. A comprehensive understanding of the context (e.g. collaborative baccalaureate program) provides insight into real or potential areas of difficulty or conflict. Once these are identified, it is possible to take constructive steps in addressing these before problems occur or worsen. A comparison of the findings of this video-conferencing study are remarkably similar to characteristics identified in the literature describing difficult collaborative relationships (Easterbrook & Laughton, 1997; Ignash, 1992; Million & Vare, 1994; Moran & Mugridge, 1993; Red Deer College, 1997). If strategies to develop effectiveness in video-conferencing had included strategies to facilitate collaboration, some of the problematic issues identified by faculty and students may have been avoided.

While it could be argued that collaboration and video-conferencing are separate issues, each with distinct characteristics, there is growing evidence that distance education and collaboration are inextricably bound together. Conrad and Small (1989) observed that distance education by its very nature links together institutions that previously functioned as isolated and independent entities. The relationship between

these institutions at the administrative, faculty, and student levels will thus affect any cooperative efforts, including courses taught through video-conferencing.

The symbiotic relationship between video-conferencing and collaboration must also be considered when conducting evaluations on video-conferencing or collaboration. The findings of this study suggest that peoples' experience of video-conferencing was affected by their experience and perceptions of the collaborative relationship. It is also possible that the converse would be true. This in turn can yield invalid data during evaluations if questions and observations do not account for both collaboration and video-conferencing effects.

The unique finding in this study of the merging of collaboration and video-conferencing issues indicates that further research is needed in this area. The purpose of this preliminary research was to identify video-conferencing issues through the use of a qualitative, descriptive design. As such, the impact or relative importance of any of the identified issues has not been tested. Video-conferencing is a promising technology that could facilitate collaboration among different institutions, yet if the relationship between video-conferencing and its context is not better understood through further research, unanticipated problems could develop which have potential to magnify existing situations. In addition, there is need for research on other contexts into which video-conferencing (or other distance education technologies) might be introduced.

The increased demand for distance education and the new realities of collaboration among different educational institutions are opportunities that can be facilitated through the use of technology such as video-conferencing. Planning for successful video-conferencing programs needs to include a comprehensive understanding of the context(s) in which video-conferencing occurs. A more thorough understanding of contexts can also guide the development of accurate and meaningful evaluations.

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Increasing competence in video-conferencing:

The need for ongoing faculty development

Faculty play a pivotal role in assuring quality education at post-secondary institutions. Faculty select, organize, and facilitate teaching-learning through knowledge and awareness of physical and psychological environments, group and individual learner characteristics, course material, and institutional policies (Heimlich & Norland, 1994). Competent instructors are able to integrate each of these elements in a manner that facilitates teaching and learning.

The most common environment for teaching and learning is the traditional classroom in which faculty and students are physically present. Distance education however, has resulted in a new environment - the virtual classroom. In many distance education programs today, a number of geographically separated sites are linked together through audio and/or video technology. Increasing availability and accessibility of video, audio, or computer conferencing courses are an attractive option for students who wish to remain in their own communities and continue with their education. This is particularly true for nursing, which has been gradually moving from a workforce largely educated at the diploma level to one which requires a baccalaureate nursing degree (Cragg, 1991; Havice & Knowles, 1995).

There is growing recognition of the differences distance education and technology create in learning environments (Payne, 1997; Willis, 1992). Consequently teaching philosophies and strategies traditionally valued are being reexamined for their

appropriateness (Shomaker, 1995a; Shomaker, 1995b). Faculty teaching distance education courses must learn to operate communication technologies as well as modify teaching strategies. In response to changes in the teaching-learning environment and the need for technological skills, faculty orientation programs are being developed (Dillon, Hengst, & Zoller, 1991; LeBaron & Bragg, 1994; Shomaker, 1995a).

Guidelines for developing orientation programs are often based on post-course reflections by teaching faculty (Dillon, Hengst, & Zoller, 1991). While providing helpful insights, this approach has limitations as post-course reflections may be different from the immediate needs and feelings of faculty who have not yet taught a distance education course. Reflections by students can also provide valuable recommendations from a student perspective. In addition, variations in the type of technology employed and local contexts of distance education may result in different learning needs among faculty of different institutions and programs. Research that examines faculty and student perspectives in specific contexts can provide valuable information for local orientation programs as well as contributing to the knowledge about common learning needs.

The Study

This study took place in a large Canadian university Faculty of Nursing and collaborating nursing departments in three regional community colleges. Video-conferencing was used to offer graduate and undergraduate courses to students at all four sites. Room arrangements and type of equipment varied between sites, although

all sites used six ISDN lines for transmission of audio and visual signals and each received video images on a 35 inch television screen. Interaction was facilitated through a voice activated mechanism that could be muted by faculty at each of the different sites. Each site had technical support personnel designated for video-conferencing, although they were not always readily available during the time classes occurred.

The purpose of this research was to describe the issues that nursing faculty and students say they have about video-conferencing. As there are few studies in which the characteristics of the program were similar to those in which this study took place, a descriptive design was used. Faculty who had not taught video-conferencing courses, those with experience teaching through video-conferencing, and students enrolled in video-conferencing classes were interviewed. A broad cross-section of experiences among the 23 participants added to the rigour of this study.

Approval to conduct the research was given initially by the Ethical Review Committee at the university and subsequently by each of the colleges. Data were collected through audio-taped, semi-structured interviews in either individual or group sessions. Reliability of data was ensured through interviewing techniques that included immediate reflection and rephrasing of faculty and student comments by the researcher. Interviews were conducted until there was clear data saturation. In addition, each interview was double checked for accuracy in transcription, and a comparison of

coding was made between the researcher and an advisor. Memos of thoughts, insights, data analysis decisions, and field notes completed the audit trail.

Content analysis techniques were used to analyze transcribed interviews. Data were coded according to main ideas expressed in sentences and paragraphs. They were then grouped into exhaustive and mutually exclusive categories (Krippendorf, 1980; Miles & Huberman, 1994). Analysis techniques included continuous comparisons and grouping of data, identification of concepts and relationships, and detection of recurring patterns and themes.

Findings

In the interview sessions, students and faculty were asked to describe their experiences with video-conferencing. After initially describing the number and types of video-conferencing courses they had taught or taken, faculty and students began to detail their experiences during these courses. A pattern showing varying levels in knowledge and awareness of video-conferencing and teaching emerged.

In the diagram illustrating this pattern [Figure 3-1], "Knowledge" is considered to be learning that occurs through the cognitive domain. "Awareness" refers to learning acquired through the perceptual domain (Baldwin, 1971) which includes sensory perceptions and intuition. Both knowledge and awareness have the potential to increase, and are thus represented by strands that broaden as they progress forward. Each cross-over of these strands symbolizes integration of knowledge and awareness into an instructor's teaching practice. This integration results in increasing competency

in teaching through video-conferencing. Knowledge without awareness, or awareness without knowledge cannot result in competency. In this study, video-conferencing and its relationship with the facilitation of teaching-learning were two key areas in which knowledge and awareness needed to increase and be integrated into teaching practice.

The degree to which faculty obtain and integrate knowledge and awareness of technology and teaching-learning appears to have some relationship with student perceptions of the quality of courses and instruction. Classes regarded highly were taught by faculty who were described as being able to create an atmosphere in which students at every site felt they were included in the class proceedings. To accomplish this, faculty needed to be able to operate the technology in a seamless manner, and adapt teaching tools and strategies to meet student needs. The importance for developing competency in these areas is reflected in the types of issues identified by students and faculty. While most of the people interviewed had ideas about characteristics of an ideal video-conferencing instructor, at this early stage in the video-conferencing program, very few instructors were described (either by themselves or by students) as having a high degree of competency in teaching via video-conferencing.

Knowledge

The initial concern for faculty instructors was learning how to operate video-conferencing equipment. One person described the situation for first time video-conferencing instructors as follows: "I saw what they went through because I did it last year… And I could see the same sort of stress in them -- 'I don't know if I really want

to do this!...Which button do I push?'". Although most faculty had some orientation to the equipment, it was insufficient for decreasing initial stress and developing competency in appropriate use of technology. Students perceived this lack of faculty knowledge and commented: "I think the best thing is to have the instructors learn how to use the stuff before they present a course with it, instead of learning as they go. It's frustrating."

Technical support varied between sites, but when available, the initial period of video-conferencing was less stressful for faculty: "The [technical support person] was involved with our orientation at the beginning. And then for most of my classes he was there at least at the beginning to get us [connected with the other sites]...So it was comforting to have him there in case of any problems. To be honest, we did a little bit of troubleshooting, but if something happened to the system, I wouldn't know what to do!" The knowledge required to solve technical difficulties was considered by some faculty as inappropriate for nursing instructors: "...it's not my job to be the technical support. My job is to be there as the teacher".

Teaching strategies and tips for visual presentations were usually included in initial orientations for faculty. Suggestions considered helpful included visual tips for clothing colours, font size recommendations for overheads, and reminders to avoid frequent, rapid hand or body movements. Some faculty wanted additional tips on facilitating verbal interaction and structuring class time, while others found this information redundant: "I must admit that I was not very enamoured with the

[orientation] because it was going over everything I ever knew about adult education. I couldn't quite see the real reason for dealing with this in relationship to video-conferencing because I wanted to know what specific techniques would be used for video-conferencing!"

An additional aspect of faculty knowledge was familiarity with course content. Faculty assigned to their first video-conferencing course preferred to be teaching material they had taught previously in a traditional classroom setting:

> "If you've never done video-conferencing before... you may not know what is affecting [student learning], how things are proceeding - whether it is the course material approach or whether it is the video-conferencing... Whereas if you've taught a course, even once, ... then one can anticipate where might be the difficult area and try to overcome those or minimize them knowing that there is another factor... the technology aspect of it."

Another faculty person commented: "I think that a lot of the way the course was handled had as much to do with the fact that I had never taught it before as it did with the fact that it was video-conferenced." Team-teaching a new course for the first time through video-conferencing also contributed to increased stress among some faculty: "The notion of having other faculty on other sites... made me more nervous because there was kind of like a thought that I had to be very well prepared for what I was doing and come across like the expert even though I didn't feel very expert in the area."

The knowledge faculty tended to value most in their initial experiences teaching via video-conference related primarily to operation of the technology. One faculty person summarized her initial experience as follows:

> "The first year really felt like we were just sort of flying by the seat of our pants. And we were kind of figuring things out as we went, and mostly getting used to the technology in the first year because it was so new… So there were times when it felt like the technology was sort of at the forefront, and so the teaching and how the class was going to go… at times seemed –I don't want to say less important but… The technology was the source of most stress the first year."

Additional knowledge about video-conferencing technology and teaching methodology/strategies which went beyond "the basics" was sought by faculty when they determined a need for it. Determination of need usually came once faculty developed an awareness of the quality of transmissions received at sites distant to them and of the teaching and learning environment created during video-conferencing.

Awareness

Increased efforts to improve teaching and learning in the video-conferencing classroom occurred once faculty became more comfortable with the technology. The instructor who described her first year as "flying by the seat of our pants" reflected on the changes that occurred after having taught two video-conferencing courses: "We did a lot of changes the second year we ran the same courses that made the teaching and the

delivery of the course better. And the technology certainly was much more in the background the second time around." These changes can be seen in the difference in instructional methodology from the initial courses to the subsequent ones: "We tended to do more lecture in the first year. In the second year we looked at different ways, or more creative ways, to do that –whether that was using more case studies, or having different guest speakers, or something like that."

The effort to find creative, more effective ways to teach came from an heightened awareness of the teaching and learning that was taking place in the video-conferencing classrooms. Many faculty began to question other sites about the quality of transmissions received. There were often significant differences in audio and video quality, and this new awareness was considered important for determining appropriate teaching strategies: "I think it would have helped me if I had… known what the quality was that [the other sites] were getting from this site." Some faculty also noted that they should have regularly asked students for more feedback regarding quality of received audio and video.

Few faculty instructing the courses reviewed the video-conferencing sessions through looking at tapes or by asking for student feedback. For those who did, they often adjusted their styles, such as the faculty person who noted: "I found different things that I hadn't expected. One was you had to consciously try and speak slower, and I tend to speak in spurts. I'm slow, and then when thoughts come I go really fast. And that's just the way I am, [but] I had to consciously try and change that." Another

faculty member said: "I found that I talk very loud. Because I wanted to make sure that [people at the other sites] heard… And so by the end of 1 ½ hours, I'd be just hoarse!" Other faculty found they had to learn how to interact over a distance; that interrupting a speaker at a different site was necessary if there was to be any degree of spontaneous interaction.

Students assumed that faculty were unaware of what it was like in the classrooms: "[Faculty] should watch themselves. I don't know if they ever do - but to tape it at a distance and then just sit down and watch and try and think what it would be like just sitting and watching what's going on." It was thought that if faculty reviewed the sessions, they could become aware of problems such as the situation described by one of the students: "It was very disconcerting that we would be looking at the back of their heads. Or if a transparency was put up... we wouldn't see anybody in the class or the instructor. And that could go on for periods of time. And really again, [we] felt like we were the remote site, and – a token."

A growing awareness of the issues resulted in attempts to find different ways for teaching course content, including more effective and appropriate interactive components such as case studies and questions prepared in advance. In addition, faculty awareness needed to include the understanding of what it might be like to be a student at one of the college sites. Students were able to perceive the difference between instructors' abilities to integrate this awareness into their teaching: "I'm quite convinced that the [first] instructor was well aware how difficult it is to participate

from the distant end - from the far site. But I'm not convinced that these last instructors recognized that our participation was any more difficult than those [at the site with the primary instructor]." Teaching strategies chosen and manner of presentation reflected the degree of awareness instructors were perceived as having.

Faculty who developed a growing awareness of the teaching and learning taking place through video-conferencing, expressed a need for technological updates and ongoing learning in instructional strategies: "I think there has to be regular inservices... Let's say I'm doing a presentation this week but then my next presentation isn't until three weeks from now... You forget if you're not practicing all the time!" Another person commented on an instructional workshop that she attended one year after first teaching a video-conferencing course. It was a two-day workshop where they were assigned a ten minute lesson which colleagues critiqued:

> "That was a really excellent two days, because not only did you get the chance to practice with the equipment, but we also got to talk to other teachers about teaching issues, teaching strategies... We got to experience what it was like to be a student at a distant site... That was an incredibly valuable experience... It changes the way you teach I believe."

Although such orientations can be very helpful, one faculty person cautioned that inservices and orientations need to be ongoing with different aspects introduced gradually. Recognizing the need for additional training usually came after experiencing a video-conferencing class: "Until you have a real class on the other end and

somebody that you really have to perform for, then I'm not sure that [an orientation] would be reasonable." Another faculty noted: "I became aware of [issues] only after we had problems."

There were individual differences in the desire and/or ability of faculty to further their own knowledge. Some faculty did extra reading, attended conferences, and searched the literature and Internet in order to enhance their understanding and skills in working with video-conferencing. This included learning and utilizing additional technology such as animated computer presentations. Some faculty however, recognized they had inherent barriers to video-conferencing that would need to be overcome if they were going to excel in the use of the video-conferencing medium:

> "I grew up in nursing, or in teaching, with not very much technology. And just like I grew up in my own personal life without dependence on a lot of technology. Whereas now there is so many more things - like even e-mail, computers,...so many things that sometimes you can't help but feel like you are – As much as you try to keep up - it still impinges on how you've grown up as a professional or as an individual in terms of what you are comfortable with."

Competence

The number of different areas requiring attention, made it difficult for most faculty to achieve the kind of teaching and learning atmosphere that they valued:

> "When you're the teacher and you're trying to keep track of the content that you are trying to present, *plus* you are trying to keep in mind students at the far site - and you want to sort of focus on them, *plus* you have students at your own site, *and* you've got the buttons on the camera, and document camera…it was hard to keep focused on all of those things at once, when really, ideally what you'd want to be able to do is just sort of focus on the students and on the material that you are trying to present."

Managing these different aspects effectively, in a way that facilitated teaching and learning, and which resulted in positive feedback for both faculty and students, indicated a high degree of competence by the instructor in teaching a course through video-conferencing. To be competent, instructors had to integrate knowledge and awareness of video-conferencing technology and the teaching and learning environment. [Figure 3-1] Affinity for technology or number of courses taught through video-conferencing did not appear to be major factors in developing competency. In addition, instructors who received unsolicited, consistently positive reviews from students ranged in video-conferencing experience from a guest lecturer, to someone who had taught a number of courses.

Discussion

This research was designed to identify issues faculty and students had about video-conferencing. The experiences of those participating in this study may not be reflective of other video-conferencing courses as there are many different

configurations in video-conferencing equipment, transmission quality, number of sites and students, and variations in subject material, instructional methodologies, and faculty and student characteristics. The findings in this study are descriptive and do not test the strength of probable relationships. However, they do suggest that there are varying degrees or stages of competency in teaching through video-conferencing.

It is clear that training in video-conferencing is an important part of preparing faculty to teach in the new classroom environment (Dillon, Hengst, & Zoller, 1991; Gehlauf, Shatz, & Fryre, 1991; Shomaker, 1995a). Beyond the initial familiarization and practice with video-conferencing equipment however, the content to be covered in training sessions is less clear. Suggestions range from designing orientations that only teach faculty to use the equipment, to sessions that include philosophy and strategies of teaching and learning.

The findings of this study reflect the diverse learning needs of faculty. Initially, the immediate concern was learning to operate the equipment. As faculty became more aware of the interaction of technology with the teaching and learning environment, they wanted to increase their knowledge about video-conferencing and related aspects of teaching-learning. In addition, there seems to be a relationship between the integration of increasing knowledge and awareness and student perceptions of competent teachers. These findings have implications for the development of faculty training and evaluation criteria in video-conferencing.

The progressive nature of learning to teach effectively using video-conferencing may be best addressed by an ongoing faculty development and training program. Provision of feedback through taping and viewing of individual teaching sessions can heighten faculty awareness of changes that need to be made. Regular, student feedback can also assist this process. As each instructor will progress at different rates, consideration should be given to individual needs. A faculty development program which has both individual and group sessions is considered ideal.

Frequent training provides opportunities for faculty to increase their competency in teaching and it addresses the concern of faculty who only periodically teach through video-conferencing. Infrequent users of the technology may find that such programs could help maintain essential knowledge and awareness between teaching assignments. Peer consultations, discussion, and support are additional benefits of these training sessions.

There is an increasing amount of information available on video-conferencing and teaching and learning, but time constraints make it difficult for faculty to access these resources. A designated expert in current and emerging teaching technologies can be an excellent resource for faculty who wish to expand their use of technology and strategies.

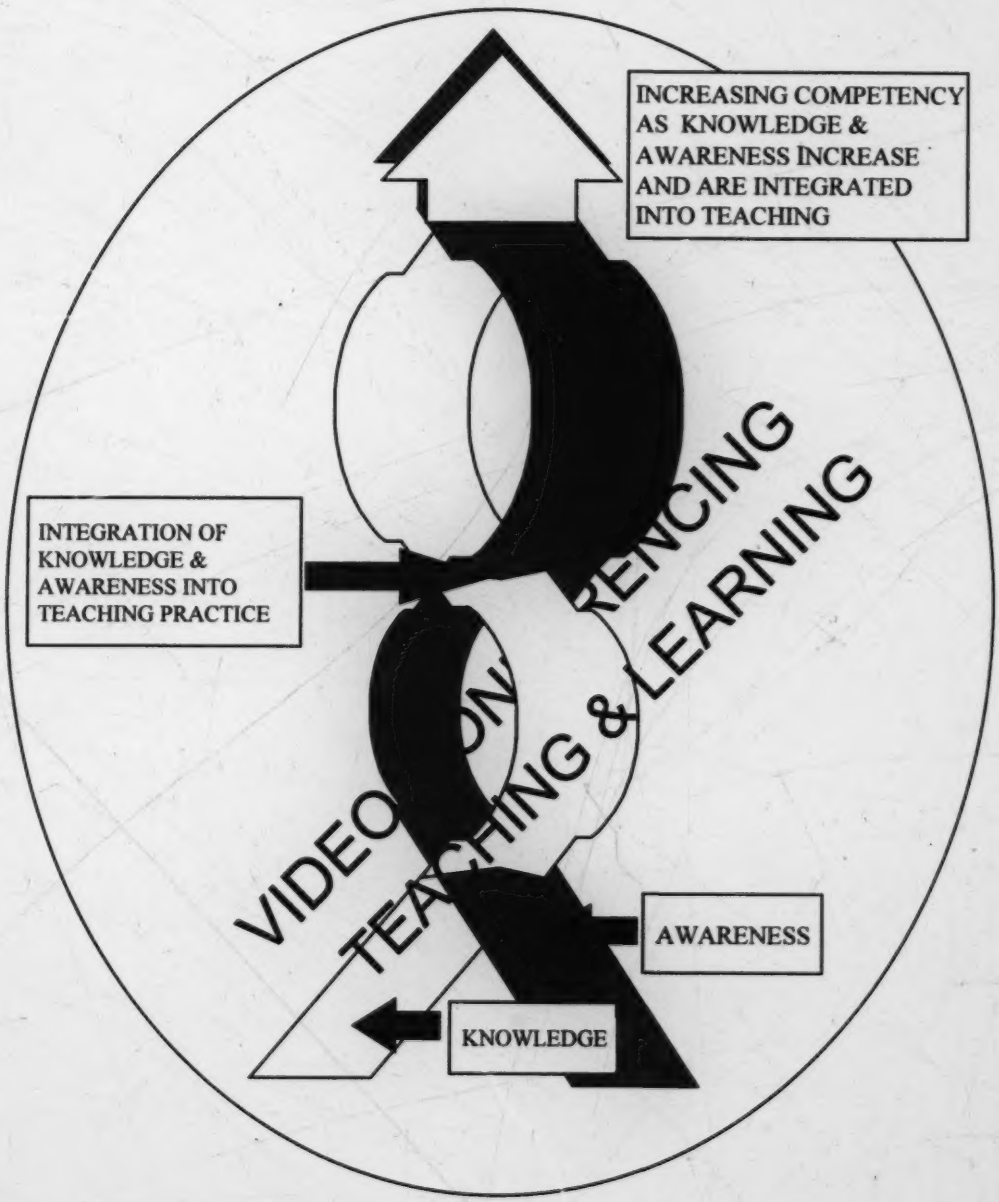
Even with well designed training programs and resources, some faculty may never become competent instructors in using video-conferencing. Further research is

needed to determine if there is a correlation between competency in traditional and video-conferencing classrooms. Research is also needed to further define what makes an instructor using video-conferencing competent, thus criteria for faculty performance evaluations could be tailored to address some of the specific aspects of teaching in this environment.

As distance education becomes increasingly available and accessible, more students will enroll in video-conferencing courses. It has been recognized that video-conferencing classrooms are indeed different from traditional classrooms, and as a result, different knowledge and awareness is required on the part of instructors in order to foster excellent teaching and learning environments. The role of faculty then, is of critical importance and care needs to be taken to develop a clear understanding of competency in teaching through video-conferencing and providing appropriate training and resources.

Figure 3-1

INCREASING COMPETENCY
IN TEACHING COURSES THROUGH VIDEO-CONFERENCING



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A Postscript...

Recent advances in technology used for distance education have resulted in systems more reflective of teaching and learning methodologies currently valued by educators. The ability to maintain simultaneous audio and/or visual contact between geographically separated sites is an attractive option for those who value an interactive philosophy and style of teaching and learning. As the relative cost of these systems has been decreasing over the years, technology is becoming more affordable and accessible to higher education institutions.

Telecommunications technologies used for distance education also provide a forum for facilitating collaboration among different institutions. In a period of increasing fiscal restraint, combining distance education and collaborative efforts allow institutions to pool resources while maintaining educational programs. In addition, access to education is increased as students are given more options for choosing courses and places of study.

The relationship between technology and collaboration is inextricably meshed for institutions which offer collaborative distance education courses. In this study, collaboration between different nursing education institutions precipitated the use of video-conferencing. Video-conferencing was in turn viewed as a tangible part of collaboration. As a result, some faculty and students identified issues related to collaboration, but experienced through video-conferencing. Technology became a collaboration issue and collaboration became a technology issue.

In addition to the contextual issue of collaboration, students and faculty identified other concerns or problems in video-conferencing. As verbal and non-verbal interaction were integral to teaching and learning for many faculty and students, difficulties encountered in the facilitation of interaction were expressed in a number of issues. These included faculty familiarity with technology and teaching methodology, pre-course organization, communication among instructors, and the ability to engage students and faculty in teaching and learning during class time. Factors affecting engagement included quality of audio and visual transmissions, time use, access to resources, and the chosen teaching methodology. The degree to which faculty integrated knowledge and awareness of both the technology and the teaching/learning environment was reflected in their preparation and teaching, and in student perceptions of the quality of those courses.

Although the effect on student learning through distance education technology was not evaluated in this study, other research indicates that academic performance is not adversely affected. However, the findings of this study, in addition to other research literature, suggest that student satisfaction with their educational experience is often adversely affected. Minute delays in audio and video transmission between sites are sufficient to deter most participants from attempts at valued spontaneous interaction. In addition, any delays - either in making and maintaining the connection between sites or during interactive components of the class - were regarded by the majority of students as a waste of their time.

There are a number of implications resulting from the issues identified in this study. Preparations and arrangements made prior to beginning a video-conferencing program need to be thorough. Any real or potential issues related to the context into which video-conferencing is being introduced must be addressed. Questions about the reasons and circumstances for introducing video-conferencing and a review of the literature will help define these issues. In situations where video-conferencing has already been introduced, frequent evaluations and reviews, particularly in the early years of the program, can assist in discerning problems or concerns. It can also identify positive aspects which strengthen the program.

Advance preparation by teaching faculty is also important. Clearly articulated and mutually agreed upon roles for teaching teams should be done prior to the onset of the course to prevent any misunderstanding or potential conflict. The role and necessity for qualified on-site instructors must also be evaluated. In nursing courses which have clinical components however, team teaching roles will always be an important part of course preparation. Advance preparation should also include development of a print base for course material. As students frequently commented that it was difficult to clearly hear or see during classes, a print base ensures that students have access to content they may have missed as a result of transmission problems. In addition, it decreases faculty time spent faxing, e-mailing, and photocopying last minute handouts or other material.

Learning to use video-conferencing technology smoothly is vital to the flow of communication. Initial orientation to the equipment provides faculty with basic operational skills, but only through increasing knowledge and awareness of the technology and the teaching/learning environment will faculty develop competence in teaching through video-conferencing. This suggests that ongoing learning opportunities for teaching faculty are essential for developing a successful video-conferencing program. Taping and reviewing of sessions taught by faculty and ongoing consultation for developing teaching strategies are two ways for facilitating faculty learning. A designated technology and teaching resource person is considered important for working to maintain and develop competence among teaching faculty.

Evaluation is an important part of any program. Identification and inclusion of real or potential issues aid in the development of meaningful and valid evaluations. The findings of this study suggest that in addition to issues commonly evaluated, context and the progressive nature of faculty competence be incorporated into evaluations.

The trends of increasing collaboration and increasing availability and affordability of technology will likely continue to result in a growing number of distance education courses. This has philosophical implications regarding the type of teaching and learning that can occur. A concern of some faculty and students was that video-conferencing did not provide them with the teaching and learning experience they most valued. The high degree of interaction and personal contact afforded in the

traditional classroom had not been transferred into the video-conferencing classroom. This was of particular concern to those who believe that nursing is highly relational, and to be properly learned, a highly inter-personal and interactive environment is required. As this concern is fundamental to the philosophy and direction of nursing education, serious discussion is needed in regards to desired learning outcomes and strategies to achieve those outcomes. At this pivotal time, nursing and other "relational" professions must determine what type of learning is essential for professional education and development. Technology and collaboration are trends that are revolutionizing higher education institutions. It is therefore vital for professions to ensure that the philosophy and goals of education determine the programs rather than technology or collaboration.

There is great potential for video-conferencing in providing opportunities for students in smaller centers to obtain university degrees and for facilitating collaboration between institutions. However, if issues that faculty and students have regarding video-conferencing are not addressed, dissatisfaction will most likely result. This has implications for student enrollment and for faculty willingness to develop competency in teaching through video-conferencing. Ongoing, comprehensive development of knowledge and awareness of video-conferencing and the teaching/learning environment is needed to create, evaluate, and sustain successful video-conferencing programs.

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APPENDIX A

Letter of Introduction to the research study:

Issues in Videoconferencing

Videoconferencing has been incorporated into the nursing program offered through the Faculty of Nursing at the University of Alberta. Videoconferencing as a technology used for instructing courses is relatively new and to date has not been extensively researched. ***This letter is being sent to nursing faculty members and students to request your participation in a research study on issues nursing faculty and students have about videoconferencing.***

The purpose of the study is to identify and describe issues that nursing faculty and students at the University of Alberta and its collaborative colleges in Red Deer, Grande Prairie, and Ft. McMurray have about videoconferencing. This study may help to develop faculty policies regarding the integration of videoconferencing into the nursing program and into faculty job descriptions and support services. Results from this study may also be used to develop orientation workshops for faculty teaching courses via videoconferencing and possibly for students taking such courses.

Data will be primarily collected through taped interviews. Each interview will last approximately one hour. A follow-up interview may be made to verify the concerns identified and described in the first interview.

Participation in this study is voluntary. Your decision to participate or not participate will not affect your position on faculty. You may also withdraw from the study at any time by notifying the researcher. Your name will not appear in this study, and all data will be kept confidential. Results from the study will be reported in a thesis in partial fulfillment of the requirements for a Masters Degree in Nursing and may also be reported in journal articles and professional conferences.

The research will be conducted by Anne Biro. *If you would like* ***more information on the study please call Anne Biro (MN candidate) at 988-5578 [email: abiro@gpu.srv.ualberta.ca], or Dr. Marion Allen (thesis supervisor) at 492-6411.***

A follow-up phone call will be made approximately one week following this letter to request your participation in this study. If you do not wish the researcher to contact you regarding your possible participation in this study, please return the attached form within the next seven days.

Thank you for your assistance!

APPENDIX A

Letter of Introduction to the research study:

Issues in Videoconferencing

Videoconferencing has been incorporated into the nursing program offered through the Faculty of Nursing at the University of Alberta. Videoconferencing as a technology used for instructing courses is relatively new and to date has not been extensively researched. ***This letter is being sent to nursing faculty members and students to request your participation in a research study on issues university nursing professors and students have about videoconferencing.***

The purpose of the study is to identify and describe issues that nursing faculty and students at the University of Alberta and its collaborative colleges in Red Deer, Grande Prairie, and Ft. McMurray have about videoconferencing. This study may help with the organization and development of future videoconferencing courses in order to better address student learning needs and concerns.

Data will be primarily collected through taped interviews. Each interview will last approximately one hour. A follow-up interview may be made to verify the concerns identified and described in the first interview.

Participation in this study is voluntary. Your decision to participate or not participate will not affect your grade in your courses. You may also withdraw from the study at any time by notifying the researcher. Your name will not appear in this study, and all data will be kept confidential. Results from the study will be reported in a thesis in partial fulfillment of the requirements for a Masters Degree in Nursing and may also be reported in journal articles and professional conferences.

The research will be conducted by Anne Biro. *If you would like* ***more information on the study or to participate in the study, please call Anne Biro (MN candidate) at 988-5578 [email: abiro@gpu.srv.ualberta.ca] or Dr. Marion Allen - research supervisor (492-4611).***

Thank you for your assistance!

APPENDIX A

Form indicating decision to opt out of proposed research:

Issues in Videoconferenicng

I have received and read the proposed research study to be conducted by Anne Biro and do not wish to be contacted further regarding my participation in this study. I understand that returning this form to the researcher will indicate my decision not to participate in this study.

Name of faculty member_____

Signature_____ Date:_____

Return form to:

Anne Biro (MN candidate),

Faculty of Nursing Graduate Office
3rd Floor, Clinical Sciences Building,
University of Alberta
Edmonton, AB
T6G 2G3

APPENDIX B

Consent Form

Research Title: Issues in Videoconferencing

Investigator: Anne Biro RN, BScN, MN candidate
phone: 988-5578 or 492-6685

Supervisor: Dr. Marion Allen
phone: 492-6411

Purpose: The purpose of the study is to identify and describe issues that nursing faculty and students at the University of Alberta and its affiliated colleges in Red Deer, Grande Prairie, and Ft. McMurray have about videoconferencing.

Procedure: This study will take place in your office, home, or classroom at times that are convenient for you and may be conducted in person, by phone, or by videoconference. The first interview will last approximately one hour and will be recorded on an audio tape (or videotape *if* the interview is conducted by videoconference). The taped interview will be transcribed, with the omission of identifying information. After the interview has been analyzed, the researcher may arrange for a second taped interview to clarify the issues identified and described in the first interview. Total time required for each participant is estimated to be between one-to-two hours. Demographic data will also be collected to aid the researcher in analysis and in description of the sample for this study.

The data collected from all of the interviews with faculty members and students taking part in this study will be analyzed together. The results of the analysis will be compiled into a report. Copies of this report will be made available to the Faculty of Nursing.

Participation: There will likely be no risk to you if you take part in this study, nor will you likely benefit directly. Results from this study may help to develop faculty and student policies regarding the videoconferencing program as a whole. Results may also be used to develop videoconferencing orientation workshops.

You do not have to be in this study if you do not wish to be. If you decide to be in the study, you may drop out at any time by telling the researcher. You do not have to answer any questions or discuss any subject in the interview if you do not want to. Taking part in this study or dropping out will not affect your position as a nursing faculty member or as a nursing student at the University of Alberta and its collaborative colleges.

Your name will not appear in this study. Only a code number will appear on any forms or question sheets. All tapes, transcriptions, questionnaires, and notes will be kept in a locked cabinet, separate from consent forms or code lists, for seven years after the completion of the study. Consent forms will be kept for at least five years. Data may be used for another study in the future, if the researcher receives approval from the appropriate ethics review committee.

The information and findings of this study may be published or presented at conferences, but your name or any material that may identify you will not be used. If you have questions or concerns about this study at any time, you can call the researcher or supervisor at the numbers above.

Consent: I acknowledge that the above research procedures have been described. Any questions have been answered to my satisfaction. In addition, I know that I may contact the persons named above if I have further questions either now or in the future. I understand the possible benefits of joining the study, as well as the possible risks. I have been assured that records relating to this study will be kept confidential. I understand that I am free to drop out at any time. I understand that if I do not participate in the study, my position on faculty or as a student will not be affected. I understand that if any knowledge from the study becomes available that could influence my decision to continue in this study, I will be informed promptly. I have been given a copy of this form to keep.

Signature of participant:_____

Date:_____

Signature of researcher:_____

Date:_____

APPENDIX C

Issues in Videoconferencing ---- Faculty Demographic Questionnaire

1. I am a faculty member at: (a)U of A [ ]; (b) GPRC [ ];
(c) Keyano College [ ]; (d) RDC [ ]

2. My position on faculty is: (a) tenure-track [ ]; (b) faculty lecturer [ ];
(c) sessional lecturer [ ]; (d) graduate student T.A. [ ]

3. For UofA faculty only: Have you ever been a faculty member of a community college? Yes [ ]; No[ ]

4. (a) How many courses a year do you usually teach?_____

(b) How many graduate courses?_____

(c) Undergraduate courses?_____

(d) What is your most common teaching style? (i.e. lecture, seminar, other)

_____

(e) How many distance education course have you taught other than videoconferencing?_____
What media was used? (i.e. audioconference, correspondence course)

(e) Do you like working with technology? Yes [ ]; No [ ]

5. How many videoconferencing courses have you taught? _____
How many videoconferencing courses are you assigned to teach this year?
Graduate [ ]; Undergraduate [ ]

What are the approximate class sizes at the different sites? U of A [ ]; GPRC [ ]

If you are teaching a videoconferencing course this year, have you previously taught it in a traditional setting (i.e. in a campus classroom)? Yes [ ]; No [ ]

6. What is you *major* role in the videoconferencing course?
Primary instructor [ ]; Site instructor [ ]; Site facilitator [ ]

7. Have you had any orientation to teaching a videoconferencing course?

(b) If so,(a) How long was the orientation?_____
Who offered the orientation?_____

(c) Did you feel your needs were met as a result of the orientation? Yes [ ]; No [ ]
Why?/Why not?

8. Did you have any exposure to videoconferencing prior to your being assigned to teach a course using the technology? (excluding orientation) Yes [ ]; No [ ]
If "yes", describe…

9. Since being assigned to teach a course using the technology, have you had any other exposure to videoconferencing? (i.e. participant, attended presentations on it at a conference, read related articles on it, etc. Yes[ ]; No [ ]
If "yes", describe…

APPENDIX C

Issues in Videoconferencing ---- Student Demographic Questionnaire

1. What program are you in? BScN (4-year)_____; BScN (post RN)_____;
   MN_____
2. How many courses have you taken through videoconferencing?
3. Have you ever taken required courses through audioconferencing?_____
   Correspondence?_____ Computer conferencing or email?_____
4. Have you ever had to commute to a distant site for a required course?
5. Are you taking a videoconferencing course at the time of this questionnaire?
6. Why are you taking videoconferencing courses?
   - new requirement (BScN) for employment at current work place
   - part of basic four year degree
   - part of MN program (unable/inconvenient to go to U of A)
   - personal interest (not a requirement)
7. Did you know when you enrolled in the class that it would be delivered through videoconferencing?
8. Have you had any exposure to videoconferencing prior to taking this course?
   If so, describe:
9. Have you had any orientation to videoconferencing?
   If so, describe:
10. On which campus do you attend classes? _____

APPENDIX D

Faculty - Guiding Questions

Semi-structured interview question guide:

1. What is your experience with videoconferencing?

2. What do you understand as important or relevant issues to videoconferencing?

3. Did you have any concerns about videoconferencing prior to teaching a course using it?
   Do you have any concerns since teaching a course using videoconferencing?

4. Do you have or see any issues regarding:

   (a) technology (i.e. technological support; quality of technology & functioning, personal use)
   (b) preparation (i.e. for teaching your class; orientation to expectations, teaching pedagogy)
   (c) administration (i.e. teaching assignment process; timetabling; considerations for additional work load [if any]; coordination with distant sites; instructors at other sites)
   (d) access to resources for distant students (i.e. library; textbooks)
   (e) teaching issues (presentation style; interaction [inclass/out of class]; student learning; student conduct during a class; working with instructors at other sites; perceptions of students)
   (f) physical set-up of classrooms
   (g) other?

5. What advice would you give to other faculty and students who will be involved with videoconferencing?

APPENDIX D

Students- Guiding Questions

Semi-structured interview question guide:

1. What is your experience with videoconferencing?

2. What do you understand as the important or relevant issues to videoconferencing?

3. Do you have or see any issues in videoconferencing related to:

   (a) technology (i.e. technological support; quality & functioning of technology, personal use)

   (b) access to resources for distant students (i.e. library; textbooks)

   (c) teaching issues (presentation style; interaction [in class/out of class]; student learning; student conduct during a class; perceptions of faculty and other students)

   (d)physical set-up of classrooms

   (e)other?

4.Are the issues you see as important now the same as the issues you had when you first took a course in facilitated by videoconferencing?

5. What things might you change to make videoconferencing a better experience?

What advice would you give to faculty or other students who will be involved with videoconferencing?

APPENDIX E

Contact Summary Forms ID#_____

Contact type:

Visit_____ Individual interview_____

Phone_____ Focus Group_____

Videoconference_____

---

1. Main issues or themes that struck me in this contact?

2. Summary of the information I got (or failed to get) on the research question?

3. Anything else that struck me as salient, interesting, illuminating or important in this contact?

4. What new (or remaining) questions do I need to ask during the next interview?